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FLOOD INSURANCE STUDY

CITY OF SHERIDAN, OREGON
YAMHILL COUNTY

COMPLETED

REVISED:
SEPTEMBER 30, 1988

ORIGINAL

Federal Emergency Management Agency

COMMUNITY NUMBER - 410257

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

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South Yamhill River — Panels 01P - 02P — pg 14 thru 15

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PUBLISHED SEPARATELY:

Flood Insurance Rate Map

FLOOD INSURANCE STUDY
FOR THE CITY OF SHERIDAN, YAMHILL COUNTY, OREGON

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the City of Sheridan, Yamhill County, Oregon, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and to assist the community in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program (NFIP) are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

This Flood Insurance Study revises and updates a previous Flood Insurance Study/Flood Insurance Rate Map for the City of Sheridan, Oregon. This information will be used by the City of Sheridan to update existing floodplain regulations as part of the Regular Phase of the NFIP. The information will also be used by local and regional planners to further promote sound land use and floodplain development.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the State (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for the original study were performed by the U.S. Army Corps of Engineers (COE), Portland District, for the Federal Emergency Management Agency (FEMA), under InterAgency Agreement No. IAA-H-10-77, Project Order No. 6. This study was completed in February 1979.

In addition, the hydrologic and hydraulic analyses for those areas annexed from Yamhill County by the City of Sheridan since 1979 were also performed by the COE, Portland District, for FEMA under Inter-Agency Agreement No. IAA-H-10-77. This work was completed by the COE in January 1981.

1.3 Community Coordination

A pre-contract meeting held on February 27, 1976, was attended by representatives of FEMA, City of Sheridan, and study contractor to identify stream reaches to be studied, explain the study concepts, identify data sources, and establish communication and coordination procedures.

An intermediate community coordination meeting was held in Sheridan on December 20, 1978. This meeting was attended by the City of Sheridan Public Works Superintendent, members of the community, representatives of FEMA, and the study contractor to allow local officials to review the work performed by the study contractor.

The results of this study were reviewed at a final community coordination meeting held on June 7, 1979. Attending the meeting were representatives of the FEMA, study contractor, and city. No problems were raised at the meeting.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area and the areas within the urban growth boundaries of the City of Sheridan, Yamhill County, Oregon. The area of study is shown on the Vicinity Map (Figure 1).

The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development or proposed construction through 1984.

2.2 Community Description

The City of Sheridan is located in south-central Yamhill County, in northwestern Oregon. It is approximately 45 miles southwest of the City of Portland, Oregon, and 12 miles southwest of the City of McMinnville, Oregon. The City of Sheridan is surrounded by the unincorporated areas of Yamhill County. The population of Sheridan increased from 1,881 in 1970, to 2,260 in 1977 (References 1 and 2).

South Yamhill River originates on the eastern slopes of the Coast Range. The river flows eastward through Sheridan and joins North Yamhill River northeast of the City of McMinnville to form Yamhill River. Upstream of Sheridan, South Yamhill River has a drainage area of approximately 250 square miles.

The terrain in Sheridan is flat, with most of the city situated within the 100-year floodplain. The majority of commercial development is located near South Yamhill River, along Bridge Street and Willamina-Sheridan Highway.

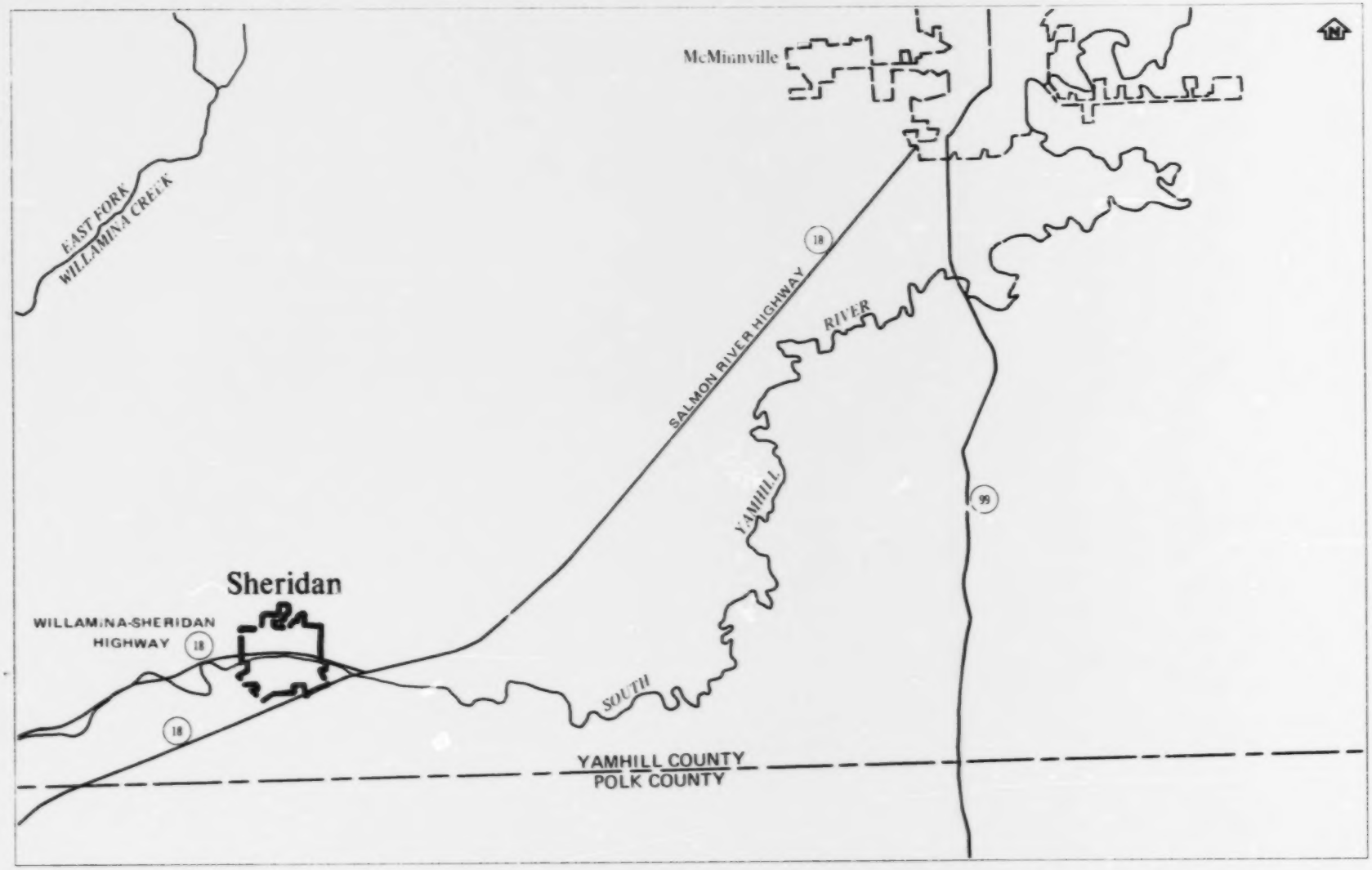

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF SHERIDAN, OR

(YAMMHILL CO.)

APPROXIMATE SCALE

2 0 2 4 6MILES

VICINITY MAP

The soils in Sheridan are poorly drained silty clay loams and clays. The floodplain is extensively developed, with grass and shrubs accounting for most of the vegetation.

Average annual precipitation varies greatly throughout the South Yamhill River basin, from approximately 55 inches in the vicinity of Sheridan to more than 100 inches near the Coast Range. The majority of the precipitation usually occurs during the period from November through February. Temperatures at the lower elevations of the basin are moderate, averaging from 38°F in the winter to 65°F in the summer.

2.3 Principal Flood Problems

Flooding in Sheridan is caused by massive Pacific rainstorms. The largest recorded flood on South Yamhill River occurred on December 22, 1964. The peak discharge at the U.S. Geological Survey (USGS) stream gage near the City of Willamina, 9 miles upstream of Sheridan, was 19,600 cubic feet per second (cfs) and had a recurrence interval of approximately 115 years. That flood caused extensive damage in Sheridan, and flooded almost the entire city. Floodwaters forced the closing of highways around Sheridan, isolating the city for nearly 2 days. Similar conditions can be expected to occur during a 100-year flood, because the water-surface profile for the December 1964 flood is approximately equal to the estimated 100-year flood. Figures 2 and 3 show the estimated heights of the 100- and 500-year floods in Sheridan.

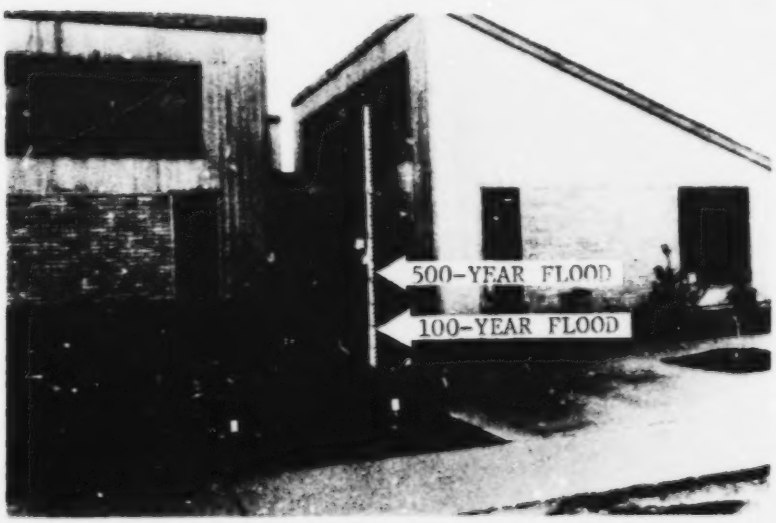

Figure 2. Possible Future Flood Heights at Sheridan Public Library

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Figure 3. Possible Future Flood Heights at Sheridan Sun Newspaper

There have been other large floods on South Yamhill River, including one in November-December 1961 that was comparable to the December 1964 flood. The most recent event was a 35-year flood in January 1972, that had a discharge of 16,800 cfs near the City of Willamina.

2.4 Flood Protection Measures

Potential dam sites for flood regulation in the South Yamhill River basin have been proposed in several studies, but none have been authorized for construction.

Sheridan has not yet established floodplain regulations aimed at reducing future flood loss. The community requires building permits for all proposed construction and reviews those permits to assure that sites are reasonably free from flooding. The FEMA guidelines for controlling development within the floodplain have been implemented by the City (Reference 3).

3.0 ENGINEERING METHODS

For the flooding sources studied by detailed methods in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equaled or exceeded once on the

average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long-term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish peak discharge-frequency relationships for each flooding source studied by detailed methods affecting the community.

Peak discharge-drainage area relationships for the South Yamhill River are shown in Table 1.

Stream gage records were statistically analyzed using the standard log-Pearson Type III method, as outlined by the U.S. Water Resources Council (Reference 4). Frequency curves were developed for the USGS stream gages on South Yamhill River near the City of Willamina (Gage No. 14192500), with 35 years of record, and near the City of Whiteson (Gage No. 14194000), with 41 years of record.

TABLE 1. SUMMARY OF DISCHARGES

Flood Source and Location	Drainage Area (square miles)	Peak Discharges (Cubic Feet per Second) 10-Year	50-Year	100-Year	500-Year
South Yamhill River					
At USGS Gage Near the City of Willamina	133	13,700	17,700	19,500	24,000
At Upstream Corporate Limits	250	21,250	28,950	32,750	43,750
At USGS Gage Near the City of Whiteson	502	34,900	46,500	51,400	66,000

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 4.2), selected cross section locations are also shown on the Flood Insurance Rate Map (Exhibit 2).

Water-surface elevations of floods of the selected recurrence intervals were computed through use of the COE HEC-2 step-backwater computer program (Reference 5).

Cross section data for the South Yamhill River were obtained through a combination of field and aerial surveys. The channel portion of each cross section was field surveyed, and the overbank portions were obtained photogrammetrically (Reference 6). Dimensions of the Bridge Street bridge were obtained in the field. Additional cross section data for the South Yamhill River were obtained from work maps developed by the COE, Portland District (Reference 7).

Base flood elevations shown on the Floodway Data Table (Table 2) for cross sections B, C, and D are not representative for the entire cross section width across the floodplain. Orientation of base flood elevations shown on the Flood Insurance Rate Map (published separately) was determined through a combination of computed elevations on the South Yamhill and historical high-water marks along the floodplain.

Roughness factors (Manning's "n") used in the hydraulic analysis were first estimated from field observations of the stream and floodplain areas. The "n" values for South Yamhill River were then adjusted, where necessary, to duplicate the actual water-surface profile of the December 1964 flood. Final calibrated "n" values for the channel ranged from 0.040 to 0.064; for the overbanks, they ranged from 0.070 to 0.150.

Starting water-surface elevations for South Yamhill River were obtained from the Flood Insurance Study for the unincorporated areas of Yamhill County (Reference 8).

Flood profiles were drawn showing computed water-surface elevations to an accuracy of 0.5 foot for floods of the selected recurrence intervals (Exhibit 1).

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH[2] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
South Yamhill River								
A	37.28	475[2]	4,153	7.9	179.9	179.9	180.6	0.7
B	37.49	410[2]	5,063	6.5	182.4	182.4	183.3	0.9
C	37.69	261[2]	4,587	7.1	184.4	184.4	185.0	0.6
D	38.03	256	4,401	7.4	188.5[3]	188.5[3]	189.1[3]	0.6
E	38.39	256	5,174	6.3	192.0[3]	192.0[3]	192.8[3]	0.8
F	38.50	247	5,160	6.3	192.8[3]	192.8[3]	193.6[3]	0.8
G	39.17	352[2]	6,939	4.7	196.7	196.7	197.4	0.7
H	40.10	1,724[2]	15,472	2.1	199.4	199.4	200.2	0.8

[1]Miles Above Mouth
[2]Floodway Lies Entirely Outside Corporate Limits
[3]Elevation Not Representative of Entire Cross Section Width Across the Floodplain

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF SHERIDAN, OR

(YAMHILL CO.)

FLOODWAY DATA

SOUTH YAMHILL RIVER

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study are shown on the maps; the description of the marks are presented in Elevation Reference Marks (Exhibit 3).

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages state and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study provides 100-year floodplain elevations and delineations of the 100- and 500-year floodplain boundaries and 100-year floodway to assist communities in developing floodplain management measures.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For each stream studied by detailed methods, the 100- and 500-year floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:4,800, with a contour interval of 5 feet (References 6 and 7).

The 100- and 500-year floodplain boundaries are shown on the Flood Insurance Rate Map (Exhibit 2). On this map, the 100-year floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zone AE); and the 500-year floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 100- and 500-year floodplain boundaries are close together, only the 100-year floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the NFIP, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1.0

foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodways presented in this study were computed for certain stream segments on the basis of equal conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated at selected cross sections (Table 2). In cases where the floodway and 100-year floodplain boundaries are either close together or collinear, only the floodway boundary has been shown.

The area between the floodway and 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 4.

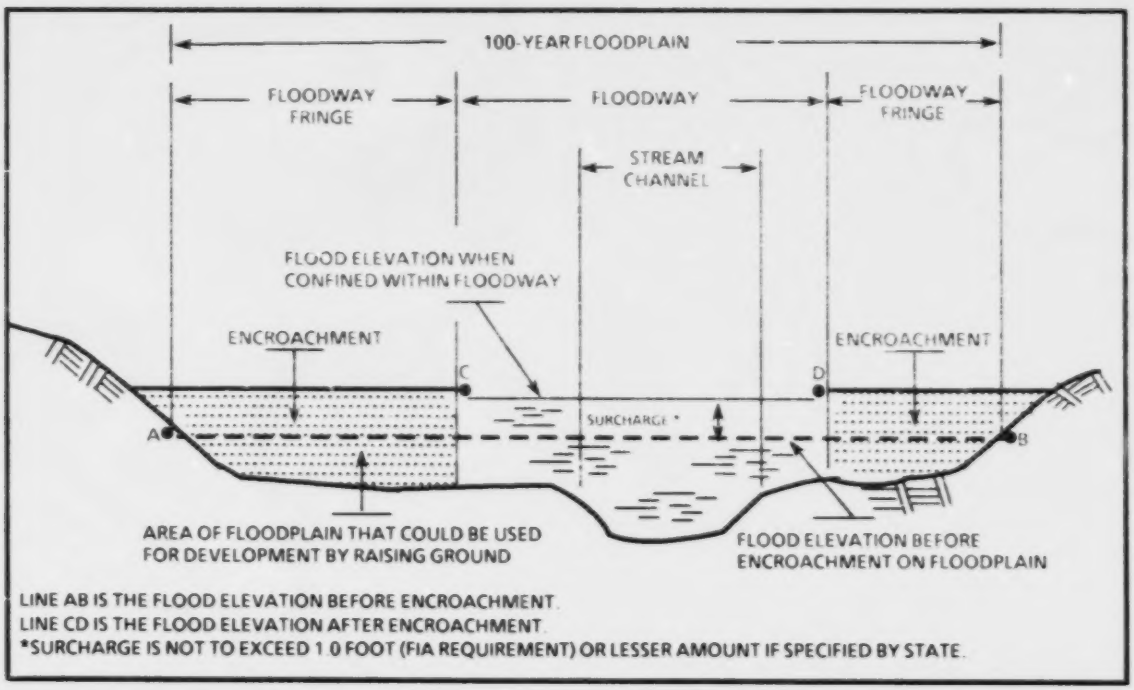
100-YEAR FLOODPLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
A
B
SURCHARGE *
AREA OF FLOODPLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOODPLAIN
LINE AB IS THE FLOOD ELEVATION BEFORE ENCROACHMENT.
LINE CD IS THE FLOOD ELEVATION AFTER ENCROACHMENT.
*SURCHARGE IS NOT TO EXCEED 1.0 FOOT (FIA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE.

Figure 4. Floodway Schematic

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5.0 INSURANCE APPLICATION

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 500-year floodplain, areas within the 500-year floodplain, areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 100- and 500-year floodplains, floodways, and locations of selected cross sections used in the hydraulic analyses and floodway computations.

7.0 OTHER STUDIES

The COE has prepared a Flood Insurance Study for the unincorporated areas of Yamhill County (Reference 8), including the area surrounding Sheridan. The results of the Sheridan and Yamhill County Flood Insurance Studies are in full agreement. No other studies concerning flood hazards in Sheridan were found to exist at the time of this report.

The FEMA previously published a Flood Hazard Boundary Map for Sheridan (Reference 9). This Flood Insurance Study is more detailed and, thus, supersedes that map.

8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting the Chief, Natural and Technological Hazards Division, FEMA, Federal Regional Center, 130 228th Street, S.W., Bothell, Washington 98021-9796.

9.0 BIBLIOGRAPHY AND REFERENCES

1. Secretary of State of Oregon, Oregon Blue Book, 1975-1976

2. Portland State University, Population Estimates: Oregon Counties and Incorporated Cities, July 1977

3. U.S. Department of Housing and Urban Development, Federal Insurance Administration, "Code of Federal Regulations, Title 24, Chapter 10, Parts 1910.3A and 3B," Federal Register, Vol. 41, No. 207, Revision 1976

4. U.S. Water Resources Council, "Guidelines for Determining Flood Flow Frequency," Bulletin 17, March 1976

5. U.S. Department of the Army, Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water-Surface Profiles, Generalized Computer Program, Davis, California, November 1976, updated August 1977

6. David C. Smith and Associates, Orthophoto Topography Map, Scale 1:4,800, Contour Interval 5 feet: Yamhill River, Oregon (May 1974)

7. U.S. Department of the Army, Corps of Engineers, Flood Plain Information, South Yamhill River, Scale 1:4,800, December 1, 1978

8. Federal Emergency Management Agency, Flood Insurance Study, Yamhill County, Oregon (Unincorporated Areas), March 30, 1983

9. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, City of Sheridan, Oregon, Scale 1:12,000, August 30, 1976

EXHIBIT 3 - ELEVATION REFERENCE MARKS

Reference Mark	Elevation (feet NGVD)	Description of Location
RM1	191.640	Disk stamped "B 127 1942" concrete post, at the intersection of Willamina-Sheridan Highway and Northwest Lincoln Street, 15 feet north of the north curb of the highway, 1 foot west of the curb of Lincoln Street. Established by U.S Bureau of Reclamation.
RM2	194.678	Disk stamped "Y 156 1941," in the northeast corner of main span of Bridge Street bridge, on top of curb at east edge of roadway. Established by U.S. Bureau of Reclamation.
RM3	197.611	U.S. Coast and Geodetic Survey bronze azimuth disk stamped "Sheridan 1941," located approximately 0.8 mile west along State Highway 18 (business) from the city hall at Sheridan, at the "T" junction of a gravel road north, approximately 117 feet northeast of a railroad crossing, 38.5 feet west of and across the road from telephone pole 441/F3, 30.3 feet north of centerline of the highway, 19 feet west of the centerline of the road, and set in the top of a concrete post projecting 0.2 foot above the ground.

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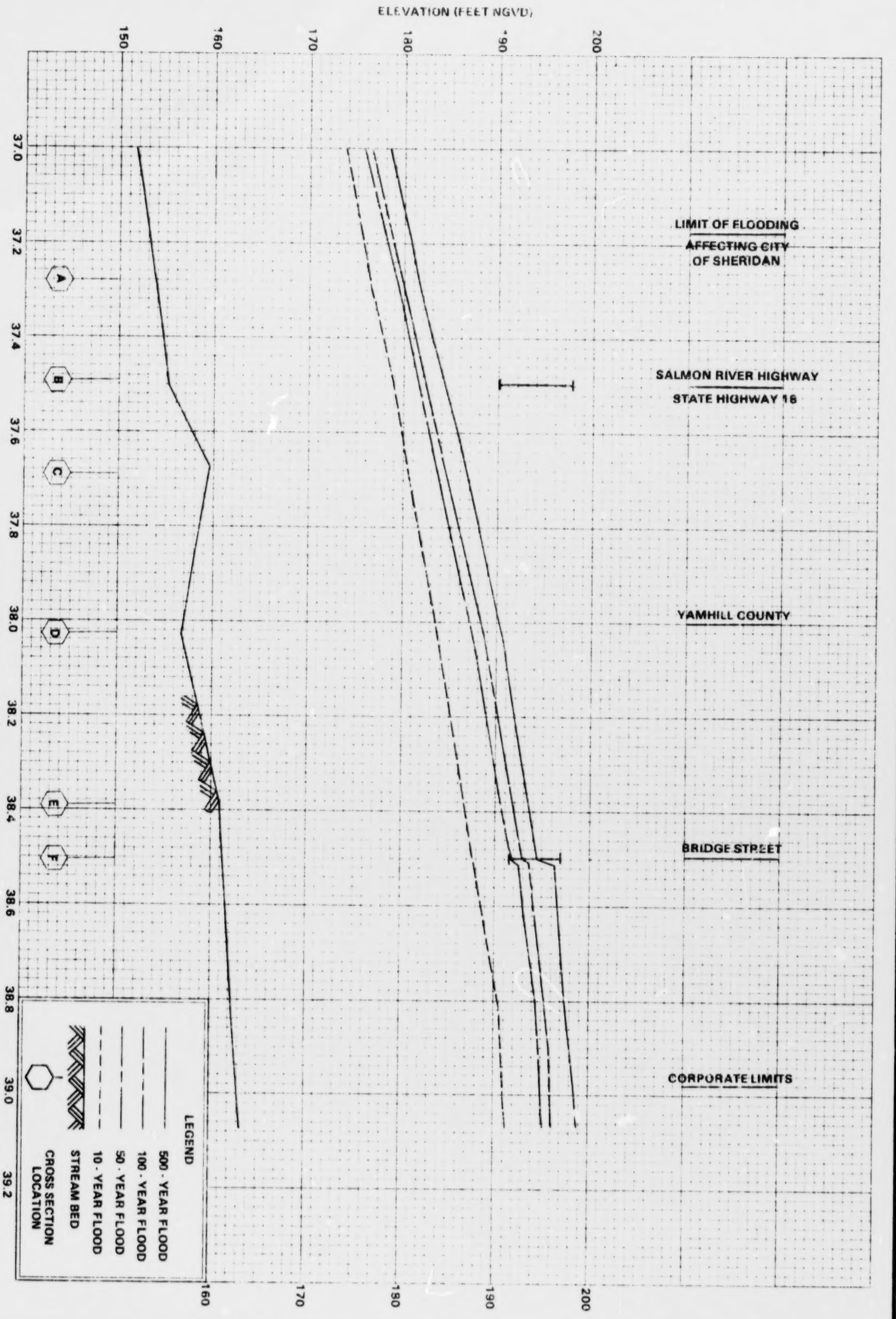
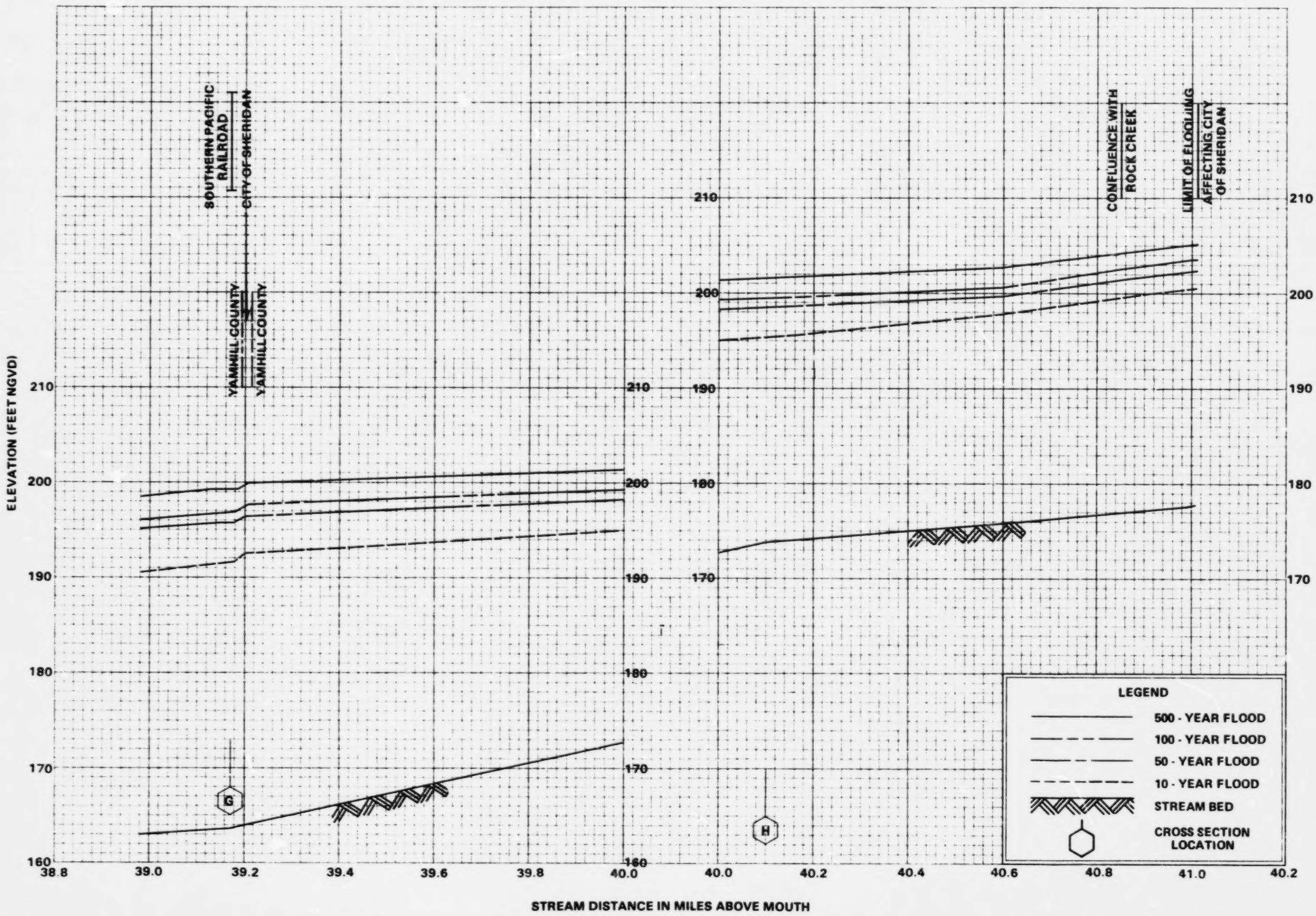


01P	FEDERAL EMERGENCY MANAGEMENT AGENCY CITY OF SHERIDAN, OR (YAMHILL CO.)	FLOOD PROFILES SOUTH YAMHILL RIVER

14



FLOOD PROFILES

SOUTH YAMHILL RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF SHERIDAN, OR
(YAMHILL CO.)

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